UCRL-ID-145893

Switchyard Enclosure Seismic Criteria Calculations

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August 27, 2001

U.S. Department of Energy
Lawrence Livermore National Laboratory

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TO: Switchyard Enclosure Design File

FROM: Becky Patton

SUBJECT: Switchyard Enclosure Seismic Criteria Calculations

Finite Element Analysis[1] (FEA) was conducted on the four Beam Enclosure Assembly drawings list below:

- AAA97-108954 (Quad)
- AAA97-108981 (Quad Intermediate)
- AAA98-101193 (Bundle)
- AAA97-108982 (Double Quad)

Each drawing chosen represents one of the four enclosure types: Quad, Quad Intermediate, Bundle, and Double Quad. They were chosen because they have the longest length between supports for their type and are therefore the worst case condition from the standpoint of seismic induced stress

The purpose of the analysis was to find the maximum acceleration that each enclosure assembly can withstand and with this value determine the safety factor.

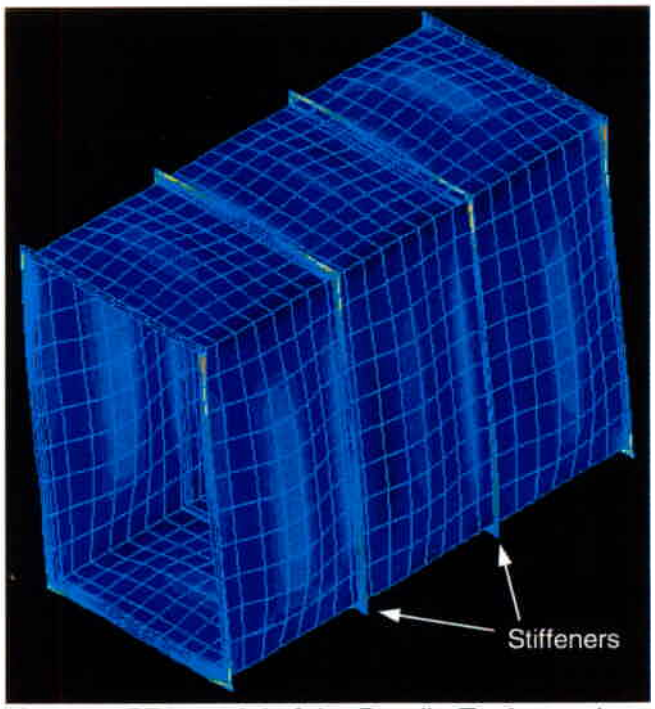

Figure 1 FEA model of the Bundle Enclosure in its deformed shaped. The colors indicate where the stresses occur.

[1] FEA was performed using Cosmos/M, Version 2.5, running on a PC with a Windows 98 operating system.

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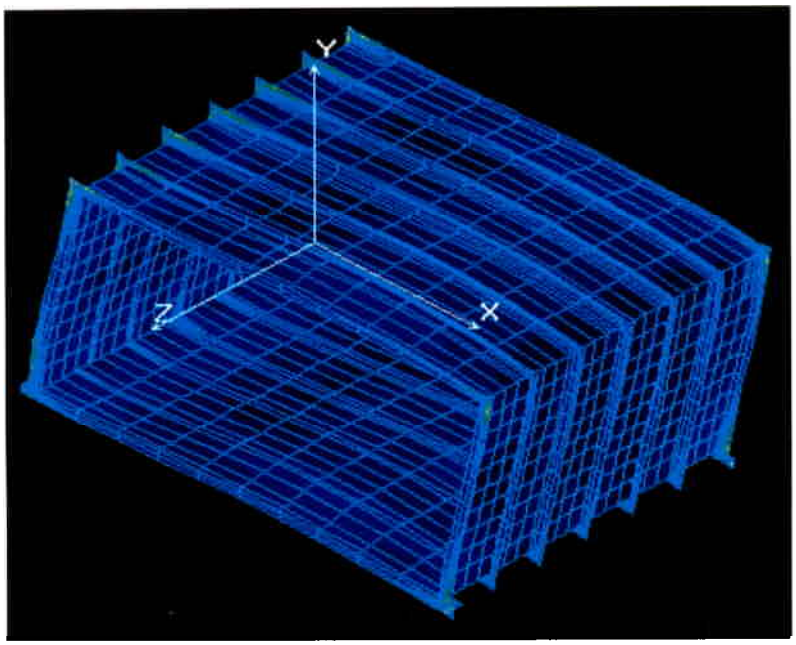

Figure 2 FEA model of the Double Quad Enclosure in its deformed shaped. The colors indicate where the stresses occur.

Results

Equal accelerations were applied in all three directions. The maximum accelerations were found using a yield strength of 41.0 ksi.[2] The safety factors were then calculated using an allowable seismic acceleration of 2.5g.[3] The resulting values are given in Table 1.

The script used to run each model is attached to this document.

Table 1 Maximum acceleration and safety factor values for each enclosure assembly.

	Quad	Quad Intermediate	Bundle	Double Quad
Maximum Acceleration	11.16g	8.44g	7.65g	12.61g
Safety Factor	4.46	3.38	3.06	5.04

[2] This value is the yield strength for the flanges as reported in the material certifications provided by the fabricator. It is the smallest yield strength that makeup any of the enclosure assemblies.

[3] This value came from the Response Spectra Analysis performed by Dave Trummer.

Quad Enclosure (AAA97-108954)

```
C*-------------------------------------------------------------------------------
C*
C* COSMOS/M      Geostar V2.50
C* Problem : z        Date : 08-23-2001  Time : 09:50:07
C*
C*-------------------------------------------------------------------------------
C*
C* Define the material
C*
PICK_MAT,1,A_STEEL,FPS
C* MATL:A_STEEL      : ALLOY STEEL
C* EX       0.30E+08   psi
C* NUXY      0.28
C* GXY       0.12E+08   psi
C* ALPX      0.74E-05   /Fahrenheit
C* DENS      0.73E-03   lbf*s*s/in**4
C* KX       0.67E-03   BTU/in/s/F
C* C (Cp)     42.       BTU*in/lbf/s/s/F
C*
C* Define the first element group and the thickness
C*
EGROUP,1,SHELL4,2,0,0,0,0,0,0
RCONST,1,1,1,1,.075
C*
C* Create and mesh the enclosure
C*
PLANE,Z,0,1
PT,1,0,0,0
PT,2,45.3,0,0
PT,3,45.3,48.2,0
PT,4,0,48.2,0
CRLINE,1,1,2
CRLINE,2,2,3
CRLINE,3,3,4
CRLINE,4,4,1
SFEXTR,1,4,1,Z,119.2
M_SF,1,4,1,4,10,22,1,1
C*
C* Define the second element group and the thickness
C*
EGROUP,2,SHELL4,2,0,0,0,0,0,0
RCONST,2,2,1,1,.1875
C*
C* Create and mesh the end flanges and the stiffener
C*
PTGEN,1,1,4,1,0,0,0,2
PTGEN,1,2,3,1,0,2,0,0
PTGEN,1,1,4,3,0,-2,0,0
PTGEN,1,14,16,1,0,0,2,0
PTDEL,18,18,1
PTGEN,1,15,13,1,0,0,-2,0
PTDEL,21,21,1
PTGEN,1,13,16,1,0,0,0,2
SF4PT,5,3,11,10,2,0
SF4PT,6,3,14,13,2,0
SF4PT,7,14,17,19,16,0
SF4PT,8,11,12,4,3,0
SFPTBRK,7,4,0.0001,0
```

```
SFPTBRK,7,3,0.0001,0
SF4PT,11,12,4,1,22,0
SF4PT,12,4,29,15,1,0
SFDEL,11,11,1
PTGEN,1,25,25,1,0,0,-2,0
SF4PT,13,33,25,23,20,0
SFDEL,13,13,1
SF4PT,11,4,12,9,1,0
SF4PT,13,1,9,10,2,0
PTGEN,1,15,13,1,0,0,-2,0
SF4PT,14,15,35,33,13,0
SFPTBRK,14,2,0.0001,0
SFPTBRK,14,1,0.0001,0
M_SF,7,9,2,4,2,2,1,1
M_SF,14,15,1,4,2,2,1,1
M_SF,5,6,1,4,2,10,1,1
M_SF,10,16,6,4,2,10,1,1
M_SF,8,8,1,4,10,2,1,1
M_SF,11,11,1,4,2,10,1,1
M_SF,12,12,1,4,2,10,1,1
M_SF,13,13,1,4,2,10,1,1
ACTDMESH,SF,1
SFSYM,5,16,1,Z,1,119.2
SFGEN,1,8,13,5,0,0,0,59.6
SFGEN,1,5,11,6,0,0,0,57.6
SFGEN,1,6,7,1,0,0,0,59.6
SFGEN,1,9,10,1,0,0,0,59.6
SFGEN,1,12,12,1,0,0,0,59.6
SFGEN,1,14,16,1,0,0,0,59.6
SFEXTR,52,88,36,X,1.346,6,1
SFEXTR,55,83,28,X,-1.346,6,1
SFEXTR,14,61,47,X,3.346,6,1
SFEXTR,44,77,33,X,-3.346,6,1
SFPTBRK,46,43,0.0001,0
SFPTBRK,45,13,0.0001,0
SFPTBRK,51,15,0.0001,0
SFPTBRK,52,51,0.0001,0
M_SF,41,54,1,4,2,2,1,1
C*
C* Merge and compress nodes
C*
NMERGE,1,3516,1,0.0001,0,1,0
NCOMPRESS,1,3516
C*
C* Bond end flanges and the stiffener to the enclosure
C*
BONDDEF,1,1,5,1,1,1,1,2
BONDDEL,1,1,1
BONDDEF,1,1,1,1,13,25,12,2
BONDDEF,2,1,2,1,5,17,12,2
BONDDEF,3,1,3,1,8,20,12,2
BONDDEF,4,1,4,1,11,23,12,2
BONDDEF,5,1,30,1,1,1,1,2
BONDDEF,6,1,31,1,2,2,1,2
BONDDEF,7,1,29,1,3,3,1,2
BONDDEF,8,1,32,1,4,4,1,2
C*
C* Apply constraints to the ends
C*
DSF,14,UZ,0,15,1,AR,
DSF,26,UZ,0,27,1,AR,
DSF,6,UZ,0,7,1,AR,
```

```
DSF,9,UZ,0,10,1,AR,
DSF,12,UZ,0,16,4,AR,
DSF,18,UZ,0,19,1,AR,
DSF,21,UZ,0,22,1,AR,
DSF,24,UZ,0,28,4,AR,
DSF,49,AL,0,50,1
DSF,53,AL,0,54,1
C*
C* Apply acceleration
C*
ACEL,4305,4305,4305
A_STATIC,G,0,0,1E-006,1E+010,0,0,0,0,0,0,0,0,0
C*
C* Model is now complete
```

Quad Intermediate Enclosure (AAA97-108981)

```
C*-------------------------------------------------------------------------------
C*
C* COSMOS/M     Geostar V2.50
C* Problem : N        Date : 08-29-2001  Time : 08:00:56
C*
C*-------------------------------------------------------------------------------
C*
C* Define the material
C*
PICK_MAT,1,A_STEEL,FPS
C* MATL:A_STEEL     : ALLOY STEEL
C* EX       0.30E+08   psi
C* NUXY      0.28
C* GXY       0.12E+08   psi
C* ALPX      0.74E-05   /Fahrenheit
C* DENS      0.73E-03   lbf*s*s/in**4
C* KX       0.67E-03   BTU/in/s/F
C* C (Cp)     42.       BTU*in/lbf/s/s/F
C*
C* Define the first element group and the thickness
C*
EGROUP,1,SHELL4,2,0,0,0,0,0,0,0
RCONST,1,1,1,1,.075
C*
C* Create and mesh the enclosure
C*
PLANE,Z,0,1
PT,1,0,0,0
PT,2,48.2,0,0
PT,3,48.2,37.2,0
PT,4,0,37.2,0
CRLINE,1,1,2
CRLINE,2,2,3
CRLINE,3,3,4
CRLINE,4,4,1
SFEXTR,1,4,1,Z,141.3
M_SF,1,4,1,4,10,22,1,1
C*
C* Define the second element group and the thickness
C*
EGROUP,2,SHELL4,2,0,0,0,0,0,0,0
RCONST,2,2,1,1,.1875
C*
C* Create and mesh the end flanges and stiffeners
C*
PTGEN,1,1,4,1,0,0,0,2
PTGEN,1,2,3,1,0,2,0,0
PTGEN,1,1,4,3,0,-2,0,0
PTGEN,1,14,16,1,0,0,2,0
PTDEL,18,18,1
PTGEN,1,15,13,1,0,0,-0.73,0
PTDEL,21,21,1
PTGEN,1,13,16,1,0,0,0,2
SF4PT,5,3,11,10,2,0
SF4PT,6,3,14,13,2,0
SF4PT,7,14,17,19,16,0
SF4PT,8,11,12,4,3,0
SFPTBRK,7,4,0.0001,0
SFPTBRK,7,3,0.0001,0
```

```
SF4PT,11,12,4,1,22,0
SF4PT,12,4,29,15,1,0
SFDEL,11,11,1
PTGEN,1,25,25,1,0,0,-0.73,0
SF4PT,13,33,25,23,20,0
SFDEL,13,13,1
SF4PT,11,4,12,9,1,0
SF4PT,13,1,9,10,2,0
PTGEN,1,15,13,1,0,0,-0.73,0
SF4PT,14,15,35,33,13,0
SFPTBRK,14,2,0.0001,0
SFPTBRK,14,1,0.0001,0
M_SF,7,9,2,4,2,2,1,1
M_SF,14,15,1,4,2,2,1,1
M_SF,5,6,1,4,2,10,1,1
M_SF,10,16,6,4,2,10,1,1
M_SF,8,8,1,4,10,2,1,1
M_SF,11,11,1,4,2,10,1,1
M_SF,12,12,1,4,2,10,1,1
M_SF,13,13,1,4,2,10,1,1
ACTDMESH,SF,1
SFSYM,5,16,1,Z,1,141.3
SFGEN,1,8,13,5,0,0,0,47.1
SFGEN,1,5,11,6,0,0,0,45.1
SFGEN,1,6,7,1,0,0,0,47.1
SFGEN,1,9,10,1,0,0,0,47.1
SFGEN,1,12,12,1,0,0,0,47.1
SFGEN,1,14,16,1,0,0,0,47.1
SFGEN,1,8,13,5,0,0,0,94.2
SFGEN,1,5,11,6,0,0,0,92.2
SFGEN,1,6,7,1,0,0,0,94.2
SFGEN,1,9,10,1,0,0,0,94.2
SFGEN,1,12,12,1,0,0,0,94.2
SFGEN,1,14,16,1,0,0,0,94.2
SFEXTR,14,61,47,X,2,6,1
SFEXTR,44,77,33,X,-2,6,1
M_SF,53,56,1,4,2,2,1,1
C*
C* Merge and compress nodes
C*
NMERGE,1,4516,1,0.0001,0,1,0
NCOMPRESS,1,4516
C*
C* Bond end flanges and stiffeners to the enclosure
C*
BONDDEF,1,1,5,1,1,1,1,2
BONDDEL,1,1,1
BONDDEF,1,1,1,1,13,25,12,2
BONDDEF,2,1,2,1,5,17,12,2
BONDDEF,3,1,3,1,8,20,12,2
BONDDEF,4,1,4,1,11,23,12,2
BONDDEF,5,1,30,1,1,1,1,2
BONDDEF,6,1,31,1,2,2,1,2
BONDDEF,7,1,29,1,3,3,1,2
BONDDEF,8,1,32,1,4,4,1,2
BONDDEF,9,1,42,1,1,1,1,2
BONDDEF,10,1,43,1,2,2,1,2
BONDDEF,11,1,41,1,3,3,1,2
BONDDEF,12,1,44,1,4,4,1,2
C*
C* Apply constraints to the ends
C*
```

```
DSF,14,UZ,0,15,1,AR,
DSF,26,UZ,0,27,1,AR,
DSF,6,UZ,0,6,1,AR,
DSF,10,UZ,0,10,1,AR,
DSF,12,UZ,0,16,4,AR,
DSF,18,UZ,0,18,1,AR,
DSF,22,UZ,0,22,1,AR,
DSF,24,UZ,0,28,4,AR,
DSF,7,UZ,0,9,2,AR,
DSF,19,UZ,0,21,2,AR,
DSF,53,AL,0,56,1
C*
C* Apply acceleration
C*
A_STATIC,G,0,0,1E-006,1E+010,0,0,0,0,0,0,0,0,0
ACEL,3256,3256,3256
C*
C* Model is now complete
```

Bundle Enclosure (AAA98-101193)

```
C*-------------------------------------------------------------------------------
C*
C* COSMOS/M      Geostar V2.50
C* Problem : d        Date : 08-29-2001  Time : 07:56:44
C*
C*-------------------------------------------------------------------------------
C*
C* Define the material
C*
PICK_MAT,1,A_STEEL,FPS
C* MATL:A_STEEL      : ALLOY STEEL
C* EX        0.30E+08   psi
C* NUXY      0.28
C* GXY       0.12E+08   psi
C* ALPX      0.74E-05   /Fahrenheit
C* DENS      0.73E-03   lbf*s*s/in**4
C* KX        0.67E-03   BTU/in/s/F
C* C (Cp)    42.        BTU*in/lbf/s/s/F
C*
C* Define the first element group and the thickness
C*
EGROUP,1,SHELL4,2,0,0,0,0,0,0,0
RCONST,1,1,1,1,.075
C*
C* Create and mesh the enclosure
C*
PLANE,Z,0,1
PT,1,0,0,0
PT,2,48.2,0,0
PT,3,48.2,76.8,0
PT,4,0,76.8,0
CRLINE,1,1,2
CRLINE,2,2,3
CRLINE,3,3,4
CRLINE,4,4,1
SFEXTR,1,4,1,Z,113.9
M_SF,1,4,1,4,10,22,1,1
C*
C* Define the second element group and the thickness
C*
EGROUP,2,SHELL4,2,0,0,0,0,0,0,0
RCONST,2,2,1,1,.1875
C*
C* Create and mesh the end flanges and stiffeners
C*
PTGEN,1,1,4,1,0,0,0,2
PTGEN,1,2,3,1,0,2,0,0
PTGEN,1,1,4,3,0,-2,0,0
PTGEN,1,14,16,1,0,0,2,0
PTDEL,18,18,1
PTGEN,1,15,13,1,0,0,-2,0
PTDEL,21,21,1
PTGEN,1,13,16,1,0,0,0,2
SF4PT,5,3,11,10,2,0
SF4PT,6,3,14,13,2,0
SF4PT,7,14,17,19,16,0
SF4PT,8,11,12,4,3,0
SFPTBRK,7,4,0.0001,0
```

```
SFPTBRK,7,3,0.0001,0
SF4PT,11,12,4,1,22,0
SF4PT,12,4,29,15,1,0
SFDEL,11,11,1
PTGEN,1,25,25,1,0,0,-2,0
SF4PT,13,33,25,23,20,0
SFDEL,13,13,1
SF4PT,11,4,12,9,1,0
SF4PT,13,1,9,10,2,0
PTGEN,1,15,13,1,0,0,-2,0
SF4PT,14,15,35,33,13,0
SFPTBRK,14,2,0.0001,0
SFPTBRK,14,1,0.0001,0
M_SF,7,9,2,4,2,2,1,1
M_SF,14,15,1,4,2,2,1,1
M_SF,5,6,1,4,2,10,1,1
M_SF,10,16,6,4,2,10,1,1
M_SF,8,8,1,4,10,2,1,1
M_SF,11,11,1,4,2,10,1,1
M_SF,12,12,1,4,2,10,1,1
M_SF,13,13,1,4,2,10,1,1
ACTDMESH,SF,1
SFSYM,5,16,1,Z,1,113.9
SFGEN,1,8,13,5,0,0,0,38
SFGEN,1,5,11,6,0,0,0,36
SFGEN,1,6,7,1,0,0,0,38
SFGEN,1,9,10,1,0,0,0,38
SFGEN,1,12,12,1,0,0,0,38
SFGEN,1,14,16,1,0,0,0,38
SFGEN,1,8,13,5,0,0,0,75.9
SFGEN,1,5,11,6,0,0,0,73.9
SFGEN,1,6,7,1,0,0,0,75.9
SFGEN,1,9,10,1,0,0,0,75.9
SFGEN,1,12,12,1,0,0,0,75.9
SFGEN,1,14,16,1,0,0,0,75.9
SFEXTR,77,44,33,X,-2,6,1
SFEXTR,61,14,47,X,2,6,1
M_SF,53,56,1,4,2,2,1,1
C*
C* Merge and compress nodes
C*
NMERGE,1,4516,1,0.0001,0,1,0
NCOMPRESS,1,4516
C*
C* Bond end flanges and stiffeners to the enclosure
C*
BONDDEF,1,1,5,1,1,1,1,2
BONDDEL,1,1,1
BONDDEF,1,1,1,1,13,25,12,2
BONDDEF,2,1,2,1,5,17,12,2
BONDDEF,3,1,3,1,8,20,12,2
BONDDEF,4,1,4,1,11,23,12,2
BONDDEF,5,1,30,1,1,1,1,2
BONDDEF,6,1,31,1,2,2,1,2
BONDDEF,7,1,29,1,3,3,1,2
BONDDEF,8,1,32,1,4,4,1,2
BONDDEF,9,1,42,1,1,1,1,2
BONDDEF,10,1,43,1,2,2,1,2
BONDDEF,11,1,41,1,3,3,1,2
BONDDEF,12,1,44,1,4,4,1,2
C*
C* Apply constraints to the ends
```

```
C*
DSF,14,UZ,0,15,1,AR,
DSF,26,UZ,0,27,1,AR,
DSF,6,UZ,0,6,1,AR,
DSF,10,UZ,0,10,1,AR,
DSF,12,UZ,0,16,4,AR,
DSF,18,UZ,0,18,1,AR,
DSF,22,UZ,0,22,1,AR,
DSF,24,UZ,0,28,4,AR,
DSF,7,UZ,0,9,2,AR,
DSF,19,UZ,0,21,2,AR,
DSF,53,AL,0,56,1
C*
C* Apply acceleration
C*
ACEL,2954,2954,2954
A_STATIC,G,0,0,1E-006,1E+010,0,0,0,0,0,0,0,0,0
C*
C* Model is now complete
```

Enclosure (AAA97-108982)

```
C*-------------------------------------------------------------------------------
C*
C* COSMOS/M     Geostar V2.50
C* Problem : e       Date : 08-27-2001  Time : 08:40:59
C*
C*-------------------------------------------------------------------------------
C*
C* Define the material
C*
PICK_MAT,1,A_STEEL,FPS
C* MATL:A_STEEL     : ALLOY STEEL
C* EX       0.30E+08   psi
C* NUXY      0.28
C* GXY      0.12E+08   psi
C* ALPX     0.74E-05   /Fahrenheit
C* DENS     0.73E-03   lbf*s*s/in**4
C* KX       0.67E-03   BTU/in/s/F
C* C (Cp)    42.      BTU*in/lbf/s/s/F
C*
C* Define the first element group and the thickness
C*
EGROUP,1,SHELL4,2,0,0,0,0,0,0,0
RCONST,1,1,1,1,.075
C*
C* Create and mesh the enclosure
C*
PLANE,Z,0,1
PT,1,0,0,0
PT,2,92.8,0,0
PT,3,92.8,48.2,0
PT,4,0,48.2,0
CRLINE,1,1,2
CRLINE,2,2,3
CRLINE,3,3,4
CRLINE,4,4,1
SFEXTR,1,4,1,Z,64.4
M_SF,1,4,1,4,10,22,1,1
C*
C* Define the second element group and the thickness
C*
EGROUP,2,SHELL4,2,0,0,0,0,0,0,0
RCONST,2,2,1,1,.1875
C*
C* Create and mesh end flanges and stiffeners
C*
PTGEN,1,1,4,1,0,0,0,2
PTGEN,1,2,3,1,0,2,0,0
PTGEN,1,1,4,3,0,-2,0,0
PTGEN,1,14,16,1,0,0,2,0
PTDEL,18,18,1
PTGEN,1,15,13,1,0,0,-2,0
PTDEL,21,21,1
PTGEN,1,13,16,1,0,0,0,2
SF4PT,5,3,11,10,2,0
SF4PT,6,3,14,13,2,0
SF4PT,7,14,17,19,16,0
SF4PT,8,11,12,4,3,0
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```
SFPTBRK,7,4,0.0001,0
SFPTBRK,7,3,0.0001,0
SF4PT,11,12,4,1,22,0
SF4PT,12,4,29,15,1,0
SFDEL,11,11,1
PTGEN,1,25,25,1,0,0,-2,0
SF4PT,13,33,25,23,20,0
SFDEL,13,13,1
SF4PT,11,4,12,9,1,0
SF4PT,13,1,9,10,2,0
PTGEN,1,15,13,1,0,0,-2,0
SF4PT,14,15,35,33,13,0
SFPTBRK,14,2,0.0001,0
SFPTBRK,14,1,0.0001,0
M_SF,7,9,2,4,2,2,1,1
M_SF,14,15,1,4,2,2,1,1
M_SF,5,6,1,4,2,10,1,1
M_SF,10,16,6,4,2,10,1,1
M_SF,8,8,1,4,10,2,1,1
M_SF,11,11,1,4,2,10,1,1
M_SF,12,12,1,4,2,10,1,1
M_SF,13,13,1,4,2,10,1,1
ACTDMESH,SF,1
SFSYM,5,16,1,Z,1,64.4
SFGEN,1,8,13,5,0,0,0,10.7
SFGEN,1,5,11,6,0,0,0,8.7
SFGEN,1,6,7,1,0,0,0,10.7
SFGEN,1,9,10,1,0,0,0,10.7
SFGEN,1,12,12,1,0,0,0,10.7
SFGEN,1,14,16,1,0,0,0,10.7
SFGEN,1,8,13,5,0,0,0,21.5
SFGEN,1,5,11,6,0,0,0,19.5
SFGEN,1,6,7,1,0,0,0,21.5
SFGEN,1,9,10,1,0,0,0,21.5
SFGEN,1,12,12,1,0,0,0,21.5
SFGEN,1,14,16,1,0,0,0,21.5
SFGEN,1,8,13,5,0,0,0,32.2
SFGEN,1,5,11,6,0,0,0,30.2
SFGEN,1,6,7,1,0,0,0,32.2
SFGEN,1,9,10,1,0,0,0,32.2
SFGEN,1,12,12,1,0,0,0,32.2
SFGEN,1,14,16,1,0,0,0,32.2
SFGEN,1,8,13,5,0,0,0,42.9
SFGEN,1,5,11,6,0,0,0,40.9
SFGEN,1,6,7,1,0,0,0,42.9
SFGEN,1,9,10,1,0,0,0,42.9
SFGEN,1,12,12,1,0,0,0,42.9
SFGEN,1,14,16,1,0,0,0,42.9
SFGEN,1,8,13,5,0,0,0,53.6
SFGEN,1,5,11,6,0,0,0,51.6
SFGEN,1,6,7,1,0,0,0,53.6
SFGEN,1,9,10,1,0,0,0,53.6
SFGEN,1,12,12,1,0,0,0,53.6
SFGEN,1,14,16,1,0,0,0,53.6
SFEXTR,52,88,36,Z,1.35,6,1
SFDEL,89,90,1
SFEXTR,52,88,36,X,1.35,6,1
SFEXTR,14,61,47,X,3.35,6,1
SFEXTR,44,77,33,X,-3.35,6,1
SFEXTR,55,83,28,X,-1.35,6,1
SFPTBRK,92,43,0.0001,0
SFPTBRK,91,13,0.0001,0
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SFPTBRK,94,51,0.0001,0
SFPTBRK,95,15,0.0001,0
SFPTBRK,93,15,0.0001,0
M_SF,89,100,1,4,2,2,1,1
C*
C* Merge and compress nodes
C*
NMERGE,1,6516,1,0.0001,0,1,0
NCOMPRESS,1,6516
C*
C* Bond end flanges and stiffeners to the enclosure
C*
BONDDEF,1,1,1,1,13,25,12,2
BONDDEF,2,1,2,1,5,17,12,2
BONDDEF,3,1,3,1,8,20,12,2
BONDDEF,4,1,4,1,11,23,12,2
BONDDEF,5,1,30,1,1,1,1,2
BONDDEF,6,1,31,1,2,2,1,2
BONDDEF,7,1,29,1,3,3,1,2
BONDDEF,8,1,32,1,4,4,1,2
BONDDEF,9,1,54,1,1,1,1,2
BONDDEF,10,1,55,1,2,2,1,2
BONDDEF,11,1,53,1,3,3,1,2
BONDDEF,12,1,56,1,4,4,1,2
BONDDEF,13,1,66,1,1,1,1,2
BONDDEF,14,1,67,1,2,2,1,2
BONDDEF,15,1,65,1,3,3,1,2
BONDDEF,16,1,68,1,4,4,1,2
BONDDEF,17,1,78,1,1,1,1,2
BONDDEF,18,1,79,1,2,2,1,2
BONDDEF,19,1,77,1,3,3,1,2
BONDDEF,20,1,80,1,4,4,1,2
BONDDEF,21,1,42,1,1,1,1,2
BONDDEF,22,1,43,1,2,2,1,2
BONDDEF,23,1,41,1,3,3,1,2
BONDDEF,24,1,44,1,4,4,1,2
C*
C* Apply constraints to the ends
C*
DSF,14,UZ,0,15,1,AR,
DSF,26,UZ,0,27,1,AR,
DSF,6,UZ,0,7,1,AR,
DSF,9,UZ,0,10,1,AR,
DSF,12,UZ,0,16,4,AR,
DSF,18,UZ,0,19,1,AR,
DSF,21,UZ,0,22,1,AR,
DSF,24,UZ,0,28,4,AR,
DSF,97,AL,0,100,1
C*
C* Apply acceleration
C*
ACEL,4866,4866,4866
A_STATIC,G,0,0,1E-006,1E+010,0,0,0,0,0,0,0,0,0
C*
C* Model is now complete
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